How to IPv6 Enable the Linux CIFS Client

At SambaXP 2007, Steve French modified the Linux CIFS client so that I was able to demonstrate the first ever Linux CIFS mount of a Windows Server Longhorn share over IPv6.

In this how-to I describe how you can IPv6 enable the Linux CIFS client and use it to mount a CIFS share over IPv6.

Prerequisites

You require two servers. One server will be your Linux CIFS client. The other server must be capable of serving CIFS shares over IPv6 (for example, Windows XP, Windows Server 2003, Windows Vista or Windows Server 2008 Beta 3). The following instructions assume that both servers are configured with globally routable IPv6 addresses (i.e. have a prefix of 2000::/3). Link-local addresses will **not** work with the Linux CIFS client as it is not yet possible to specify the interface as well as the address.

On the CIFS server create a file share. In this how-to I will refer to the share as \\SERVERNAME\TESTSHARE.

Initial Checks

Before proceeding, check that you have IPv6 connectivity between the two machines. You can use **ping6** on Linux or **ping** on Windows. Resolve any IPv6 networking issues before proceeding further.

I recommend that you configure IPv4 and test that you can mount the share using IPv4 before proceeding to using IPv6. To avoid any potential name resolution problems use the CIFS server's IPv4 address instead of its name. So if the CIFS server's address is 192.168.1.250 on the CIFS client type:

mount –t cifs //192.168.1.250/testshare

If your server requires user authentication then type the following instead:

mount –t cifs //192.168.1.250/testshare –o user=*username*,pass=*password*

(Change username and password to match those of an authorised user on your CIFS server.)

Before following the instructions below **unmount** the share.

Step 1 - Download the Required Software

1. You will require a recent copy of the Linux kernel, a pre-patch containing the CIFS IPv6 code and a copy of the Samba3 source code. You should obtain the kernel and pre-patch from www.kernel.org. These instructions use linux-2.6.21.tar.gz and patch-2.6.22-rc2.bz. The Samba3 source can be obtained from www.samba.org. These instructions use samba-3.0.24 for the Samba3 source.

   .

Step 2 – Fix mount.cifs

1. There is a small bug in the current version of **mount.cifs**. To fix this you must edit the Samba source code that you downloaded from www.samba.org. These instructions assume that you know how to build and install samba from the source code.

2. When you have extracted the source code and prior to compiling it, you must modify one file. The file is under the samba source tree and is called source/client/mount.cifs.c. The diff of the change is shown below:

```
420c420
<                 } else if (strnlen(value, 35) < 35) {
---
>                 } else if (strnlen(value, 45) < 45) {
```

   All this change does is to modify the maximum length of an IP address string from 35 to 45. The change should be made on line 420.

3. Now compile Samba as normal. You do not need to install all of Samba, instead you can just replace your current **mount.cifs** with the one you have just built. The new file is under the samba source tree and is called source/bin/mount.cifs. You should copy this to the location of **mount.cifs** on your server. Normally, this is /sbin/mount.cifs.

   cp source/bin/mount.cifs /sbin/mount.cifs

Step 3 – Prepare the Kernel Source

These instructions assume that you know how to compile and install a new kernel. The additional steps that you need to take are shown below.

1. First you must patch the kernel source with the pre-patch. To do this extract the source and apply the patch. Change the following to match the location of files on your system.

   tar xvzf linux-2.6.21.tar.gz
   bunzip2 patch-2.6.22-rc2.bz2
   cd linux-2.6.21
   patch –p1 <../patch-2.6.22.rc2

2. Now you must make a small change to the Linux CIFS client code. Edit the file fs/cifs/connect.c. The change you must make is shown in the following patch:

```
923c923
<                 } else if (strnlen(value, 35) < 35) {
---
>                 } else if (strnlen(value, 45) < 45) {
```

   This means edit line 923 and change each 35 to 45.

3. Next using your preferred method of configuring the kernel ensure that CIFS and CIFS IPv6 is included in the kernel by selecting at least the following CIFS options:

```
CONFIG_CIFS=m
CONFIG_CIFS_EXPERIMENTAL=y
```

4. Now build and install your new kernel. Reboot and select your new kernel.

Step 4 – Testing the Linux CIFS Client over IPv6

1. Once your Linux CIFS client machine has booted, login as root and open a terminal window

2. From the terminal window type the following command:

   **mount –t cifs //SERVERNAME/TESTSHARE /mnt **
   –o ip=3000::1,user=*username*,pass=*password*

   You must change this command line so that SERVERNAME is the name of your IPv6 CIFS server, TESTSHARE is the name of the share on that server, /mnt is the mount-point on the Linux CIFS client, 3000::1 is the IPv6 address of the server SERVERNAME, username is the user name of an authorised user on the server SERVERNAME and password is that user's password.

   Note: You cannot use link-local addresses as the IPv6 address.

   Note: This command will work even if you did not modify the source code ***if*** the IPv6 address is less than 35 characters long. Since IPv6 addresses are often longer than 35 characters it is important to modify the source code.

   Note: Name to address resolution does not work for IPv6 addresses in the Linux CIFS client. Therefore, you must use the **ip** option to specify the IPv6 address.

3. Check that the mount exists:

   mount

4. Prove that the mount is over an IPv6 connection by displaying the connected sockets on the Linux client using:

   netstat --inet6

5. Display the same connected sockets from a command prompt on the Windows CIFS server.

   netstat –p TCPv6

6. You can now use the IPv6 CIFS mount as you would any other CIFS mount. Enjoy!

Final Note

I would be very interested to hear from anyone using the Linux CIFS client over IPv6. Please contact me using my email address below.

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